

Design and implementation of an online booking system for a cinema house

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Abstract. As businesses are getting better, and many lifestyle changes. The movie community has not changed preferences. Many people still queue to pay for placement to watch movie in cinema houses. For those who hated queueing, they would buy a VCD or DVD to watch at home. The introduction of e-services has shown that e-commerce website can promote a trendy way for people to perform booking/reservation. As far as the subject matter is concerned, online booking systems can be developed for bus stations, airports, hotels, cinemas and other centers that engage in reservation. However, in this research, we developed an online booking system for cinema house called FLOW entertainments. We used Hypertext Markup Language, Cascading Style Sheet and JavaScript for the front end and MySQL database as the back end; and PHP as the scripting language. The designed system was implemented using the XAMPP package. XAMPP comes with the Apache as the server, NetBeans and Dreamweaver CSS were used at the customer-side for the development. The developed system was successfully tested on a computer system with a 4 gigabyte RAM and a DUAL CORE processor with a processor speed of 2.16GHz.

Keywords: e-commerce; online booking, reservation; Hypertext Markup Language; Cascading Style Sheet and JavaScript.

1. Introduction

According to Zozi [1], online booking systems bring tour and activity business owners into the 21st century and it is defined as making a reservation or appointment for a service via the Internet. When you pair the technology with old-school customer service, your business gets an exciting edge for selling services and filling activities. With it, customers can book for show tickets online and pay via the Internet beforehand using debit/credit or master cards, etc. After an online payment, customer will receive a booking code or serial number which is unique for entry and also a form or ticket with the code on it will be printed by the customer. The ticket will include the passport of the customer for security against theft. In case of loss of ticket, the customer can go online to request for another one; and this differs a lot from the traditional booking, which involves long hours queuing for tickets. Some major areas of application include;

- Hotel for booking rooms
- Cinema houses
- Airport for booking tickets
- Event Organizations for football shows and concert seat reservations
- Bus and train bookings
- Used in making reservations in healthcare

1.1. Historical perspective of e-booking systems

Booking systems was brought to being by seat reservations which began with airline reservation and the history of airline reservations systems began in the late 1950s when American Airlines required a system that would allow real-time access to flight details in all of its offices, and the integration and automation of its booking and ticketing processes. As a result, Sabre (Semi-Automated Business Research Environment) was developed and launched in 1964. Sabre's breakthrough was its ability to keep inventory correct in real time, accessible to agents around the world. Prior to this, manual systems required centralized reservation centres, groups of people in a room with the physical cards that represented inventory, in this case, seats on airplanes. Wikipedia, [2], reported that in 1946, American Airlines installed the first automated booking system, the experimental electromechanical Reservisor. A newer machine with temporary storage based on a magnetic

drum, the Magnetronic Reservisor, soon followed. This system proved successful, and was soon being used by several airlines, as well as Sheraton Hotels and Goodyear for inventory control. It was seriously hampered by the need for local human operators to do the actual lookups; ticketing agents would have to call a booking office, whose operators would direct a small team operating the Reservisor and then read the results over the telephone. There was no way for agents to directly query for the system.

Other airlines soon established their own systems. Delta Air Lines launched the Delta Automated Travel Account System (DATAS) in 1968. United Airlines and Trans World Airlines followed in 1971 with the Apollo Reservation System and Programmed Airline Reservation System (PARS), respectively (Agianaku, [3]). Soon, travel agents began pushing for a system that could automate their side of the process by accessing the various ARSes directly to make reservations. Fearful this would place too much power in the hands of agents, American Airlines executive Robert Crandall proposed creating an industry-wide Computer Reservation System to be a central clearinghouse for U.S. travel; other airlines demurred, citing fear of antitrust prosecution.

A computer reservations system (CRS) is a computerized system used to store and retrieve information and conduct transactions related to air travel. Originally designed and operated by airlines, CRSes were later extended for the use of travel agencies. Major CRS operations that book and sell tickets for multiple airlines are known as global distribution systems (GDS) (Wikipedia, [2]). Airlines have divested most of their direct holdings to dedicated GDS companies, who make their systems accessible to consumers through Internet gateways. Modern GDSes typically allow users to book hotel rooms and rental cars as well as airline tickets. They also provide access to railway reservations in some markets although these are not always integrated with the main system. And now in the world today, online booking experiences are important for customers and are likely to influence future online travel portals. Based on CWT client transactions for North America [4]), online booking still has a long way to go in our world today. Based on the analysis carried out by CWT Travel Management Institute in 2006 and as shown in figure 1, the comparison of transaction costs online.

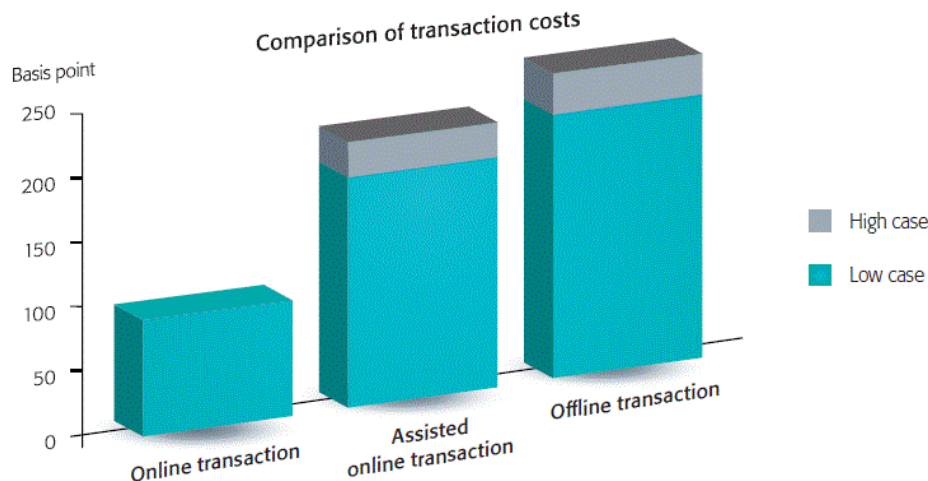


Figure 1. Comparison of transaction costs online (Source: CWT Travel Management Institute [5])

1.2. Review of related works

Naomi *et al.*, [6] developed an automated Ticket Reservation System for the Millennium Forum. The work incorporated features that aided the process of online booking for visually impaired customers. Though, the application was designed for customers to reserve theatre tickets for various shows, but customers may become distracted or tired having to listen carefully to a long spoken dialogue. In addition, is the difficulties in understanding accents, for example, Irish accents.

Alex, [7] developed a user-friendly online hotel booking web interface. The work analyzed the primary user interface and usability aspects of the booking process within hotel websites and also suggested improvements that can be made to many commonly used business to customers (B2C) booking-process designs. However, the research was limited in that it has the same level of occupancy in each room. This is a problem because, in numerous hotels, the rate per room is different depending upon the status of the room.

Ainin, *et al.*, [8] analyzed e-Ticketing as a new way of making purchase. In their work, they identified e-ticketing trends among urban communities particularly in Kuala Lumpur, its usefulness, reliability, security, conveniences and efficiency. They later developed an application that allows customers to pay for ticket

online. The limitation encountered in this work however was that the majority of the respondents were highly-educated and have high income status. These characteristics created a bias and constrain to the ability to extrapolate from the findings.

Maïke, *et al.*, [9] developed an integrated urban e-ticketing for public transport and touristic sites with the aim of combining several modes of transport (e.g. train, bus, car, bike-sharing, etc) on a single ticket. However, the implementation required great efforts, since many stakeholders need to agree on standards, overall arrangements, interfaces designs, overall purpose, and revenue sharing, which is difficult tasks in multi-actor contexts, including stakeholders in an environment that is already very difficult to govern.

Ljubica, *et al.*, [10] analyzed online hotel sales strategies with emphasis on web booking. The work was a detailed study of world achievements in the context of Information Technology (IT) development in online hotel sales matching empirical findings which consist of the entire process of designing and setting up rates and sales strategies. It also focused on the sales strategy needed to boost the web presence of the hotel for their web booking. However, it was limited in that it was difficult to adjust to today's world standards, because of outdated technology, which is due to the economic situation of that time.

Stanitov, [11] implemented a conceptual marketing framework for Online Hotel Reservation System (OHRS) which was a theoretical framework of online hotel reservation systems' (OHRS) design. The work introduced the value model of an OHRS as a central concept in the OHRS's design process and elaborates some of the critical marketing decisions in the design process including orientation of the system (to agents or direct customers), net or commissionable rates, room inventory, booking additional services, booking limitations, issuing travel and booking related documents, online payments, market intelligence, customer feedback capabilities and additional onsite resources. However, the limitation was that though it was a technically perfect website design it could be catastrophic from a marketing perspective if it does not provide excellent online customer experience and stimulates bookings.

Canada Health, Infoway [12] developed a friendly web application where customers can book appointments with doctors analyzed consumer health solutions as a way of exploring the value, benefits and common concerns of e-booking. It discovered that Canadians regularly book vacations online, use ATMs and conduct a wide variety of tasks over the Internet which previously required telephone or in-person contact. The work was limited in that it is possible for the patients to book up the whole schedule of the doctor whereas the doctor has appointment schedule that he does not want the patients to book online.

2. System analysis and design

2.1. Technological design of the system

In designing and implementing this secured system, the design architecture are into three phases (i.e. The front-end, middle-tier and back-end). These also form the components that was used in designing the system and these design components include;

Web browsers

HTML, CSS and JavaScript for the front end design

Web Server (Apache)

PHP (A scripting language)

Relational Database System (MySQL)

The System is designed to run specifically on the web apache's server and all other operating systems that make use of this technology. The System is platform independent (i.e. it can work on all web browsers) with the use of XAMP server which is the combination of Apache, PHP and the MySQL database.

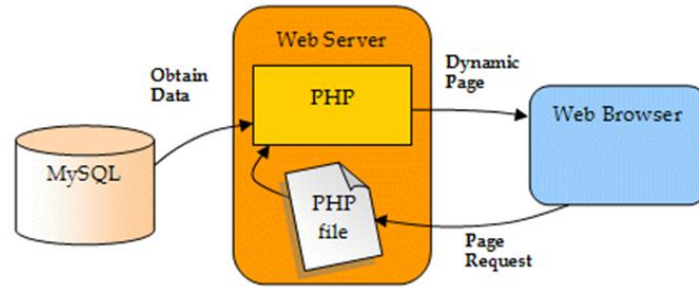


Figure 2. A technological design of the system (source: <http://mainwpex.wpengine.netdna-cdn.com/wp-content/uploads/HTML-Request.gif> [13])

Among the various components of the desired system is the figure 2 above and sketching the above figure is also represented below

The back-end components: It consists of a MySQL database. This stores all the necessary information about the administrator and users of the system. The application also allows multiple ticket purchases and as such tables were designed to have a space for it. All the information concerning the users is stored in the users table. In this case, the administrator can view the purchases and also validate such purchases. All the available films and their information are stored in the admin panel table. In this way, the administrator can add movies, time, day, and banners and so on to the system. In addition, the movie news table stores up news related to entertainment on the website, this action is done by the administrator. The available seats are stored up in the available seat table which makes it possible to indicate when a seat is booked. This (back-end) is hidden from view of regular website visitors because it is the brain of the website that is built with the server side language (PHP) and database.

The front-end components: It interacts with a customer in real time while back-end code interacts with a server to return customer ready results. Whatever is displayed on the website is mainly as a result of the query performed on the server and returned data to the front-end.

Hypertext preprocessor (PHP): It is a server side scripting language (code) in the backend that connects with a database (MySQL) to lookup, save or change data and return it back to the customer in form of front-end code

Code igniter: It is a PHP Mode View Controller (MVC) Framework that allows developers code up his/her web application with little effort while achieving much simultaneously. The framework is designed such that the developer can easily configure and manage his/her application files from a central point.

2.2. Architectural design of the system

Component Architecture:

The proposed system is a web application built on client-server architecture that allows user to get all the relevant information by accessing the site anywhere, anytime via web browser. The system also consists of two layers, client and server layers. As shown in figure 3, server interacts with several clients, ranging from from $i = 1, 2, 3 \dots \dots n$, at the same time (see figure 3).

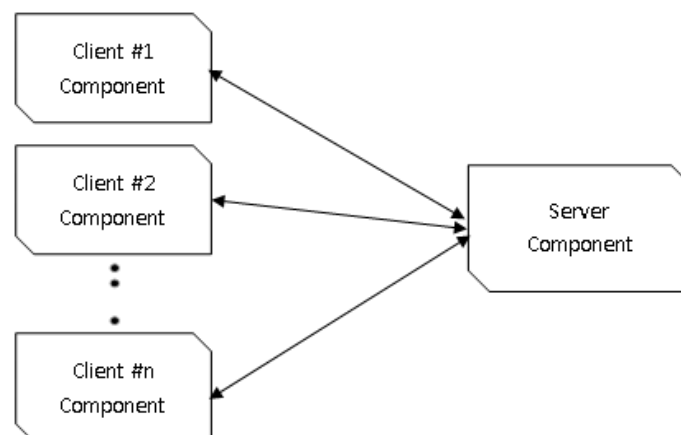


Figure 3. System component architecture

Process Architecture

As shown in figure 4, the proposed e-booking system has three tiers which are the front-end, middle tier and back-end. The customer interacts with the system through the front-end by making requests which is processed through the PHP, which is the middle tier. The system is executed on a central server and all clients communicate with it. A client handles customer interface while server handles function and operations of relevant component. All data are resident on the system server, which has the ability to interact with several clients at the same time by running several processes concurrently. Some of the processing undertaken includes verification, validations, manipulations, request processing, etc. Figure 5 also show the system architecture of the proposed system.

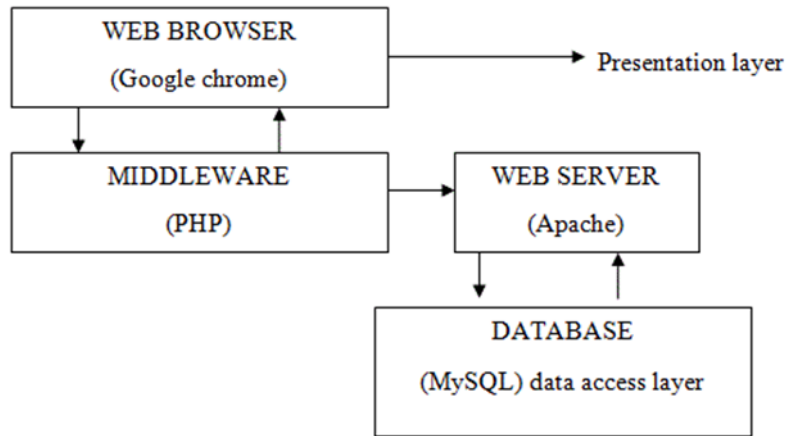


Figure 4. Architectural framework of the proposed system.

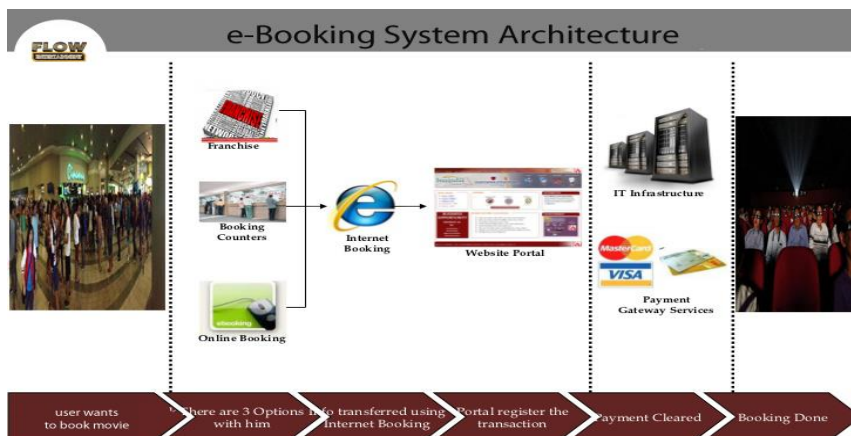


Figure 5. The System architecture of the proposed system (adopted from: <http://image.slidesharecdn.com/onlinebusreservationsystem-marketopportunities-100622121534-phpapp02/95/online-bus-reservation-system-in-india-16-728.jpg?cb=1277209034> [14])

Use case diagram of the system

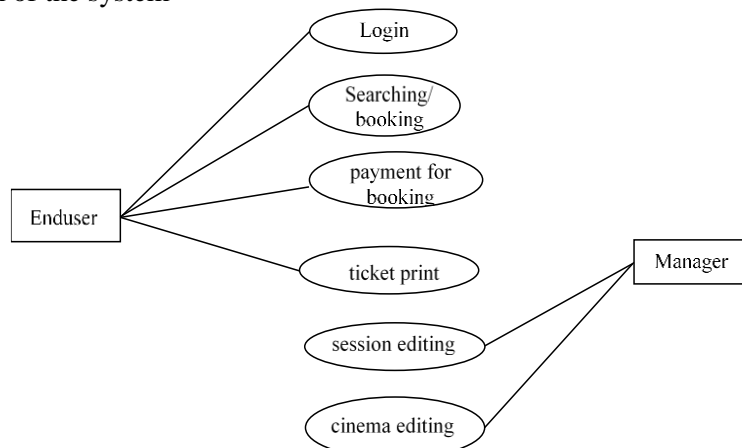


Figure 6. the use case diagram of the system

Use cases description as shown in figure 6.

Login: After registration, the customer goes through the process of logging in else, access would be denied. The user logs in with a username and password. The system will verify the username and password to check its validity before the customer is granted entry upon the validity of the information provided, else the user is denied access to the system.

Search movies: The customer can search the movies available for viewing in the system. The system will also display the information of the selected movie by the user.

Booking: the system offers a seat reservation system for the user where the user can choose the particular section or seat where he wants to sit after logging in.

Payment for booking: in other to preserve reservation after booking, the customer pays.

Ticket print: the customer prints ticket after payment.

Register: If a customer is new, he is mandated to register. If he wants to gain access to the system. The customer supplies some basic information in the registration page. This is mainly to know the number of customers using the system.

Session editing: the administrator can edit the session any time of the day.

Cinema editing: the administrator can also edit the cinema any time of the day.

2.3. Mathematical model of the system

Getting the total sale amount, the following assumptions are made:

Let available seats be A , where

$$A = a_1, a_2, a_3 \dots \dots a_n \quad (1)$$

Let the selected seats by customer

$$C_1 \text{ be } S_s(A) = A_i \quad (2)$$

Where $i = 1, 2, 3 \dots n$ and $A > 0$

Let the total number of booked seats be

$$T_b = \sum_{i=0}^n i \quad (3)$$

Let N_n be total number of seat in the cinema.

The number of unbooked seats will therefore be

$$N_{numb} = N_n - T_b \quad (4)$$

Let the total sale per movie be

$$T_s = T_b * P_m \quad (5)$$

where P_m is price per movie.

3. Implementation and testing of the design

The online booking system was designed using the PHP 5.5, MySQL Server and Apache Web Server. Registration is mandated if the user is not yet registered. The structure is such that a registered user is expected to login to his or her account before entry and from there booking for a movie can be made. The user is expected to come to the venue with a printed copy of the ticket from the Internet.

User Interface Design

The user interface is such that the users would have a wonderful user experience. The choice of colors, images and the flow of the site is such that they are designed according to standard patterns. For example, the system contains a logo instead of the name of the website so that the header would not be too cumbersome; the top film banners are in a slide bar to make the site look more interesting and dynamic.

The user interface is separated into two, that of the administrator and the customer. The administrator's interface which is entirely different from the customer's interface is used for managing the website majorly. Below are some screenshots of what the website looks like.

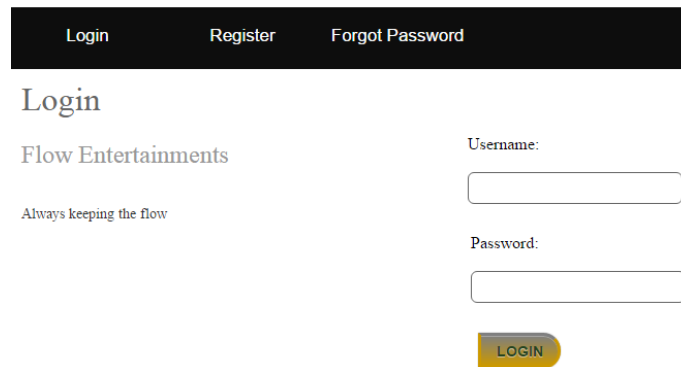


Figure 7. Login Page

This login page in figure 7 above is for the user to log into the system in order to be able to access information and other activities on the website. The registration page for new customers to create an account is shown in figure 8.

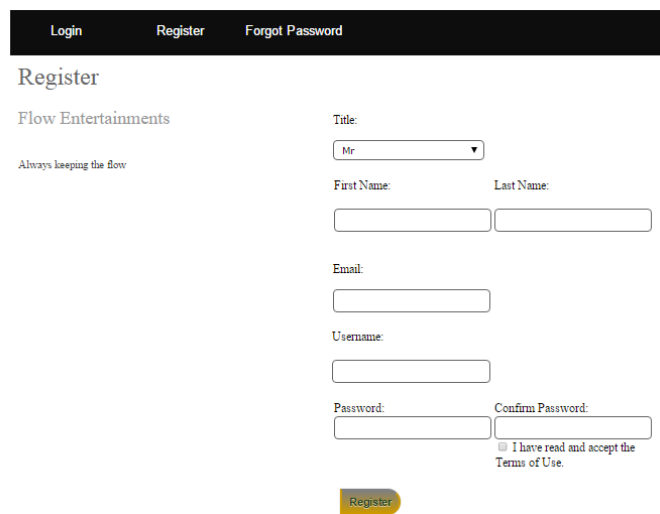


Figure 8. The registration page for the customer

Figure 9 is the homepage which the user will be directed to after successful entry into the website. It shows the major things which the site entails.

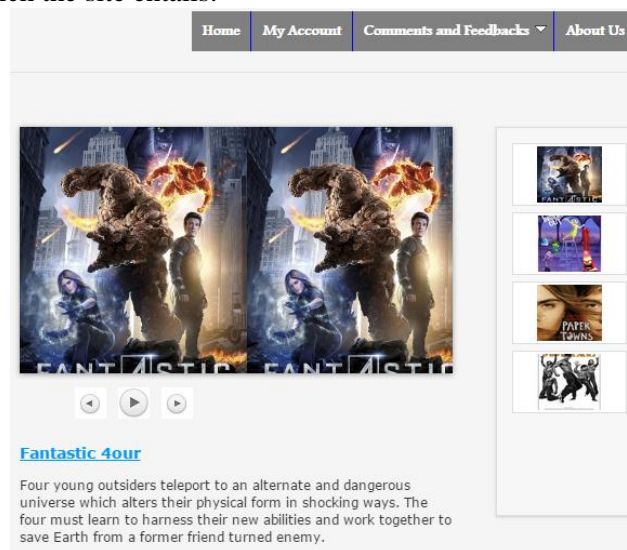


Figure 9. Homepage

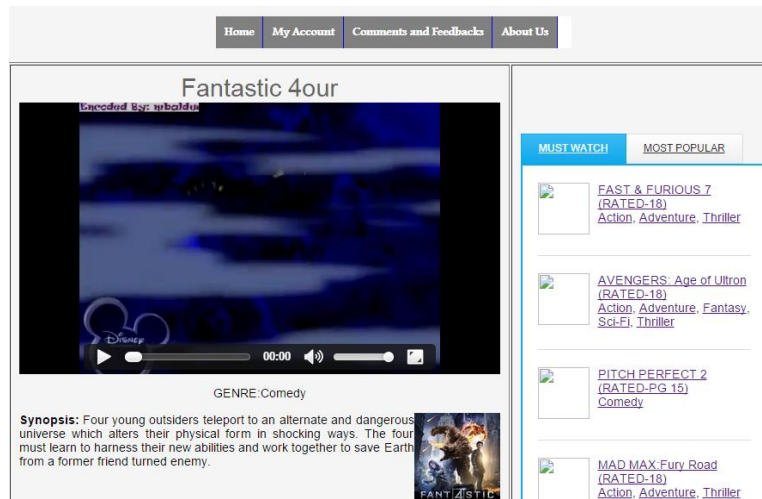


Figure 10. Movie details page

The movie details page in figure 10 is for viewing basic information about a particular movie selected on the page by the user. It displays information such as price, title, details and so on.

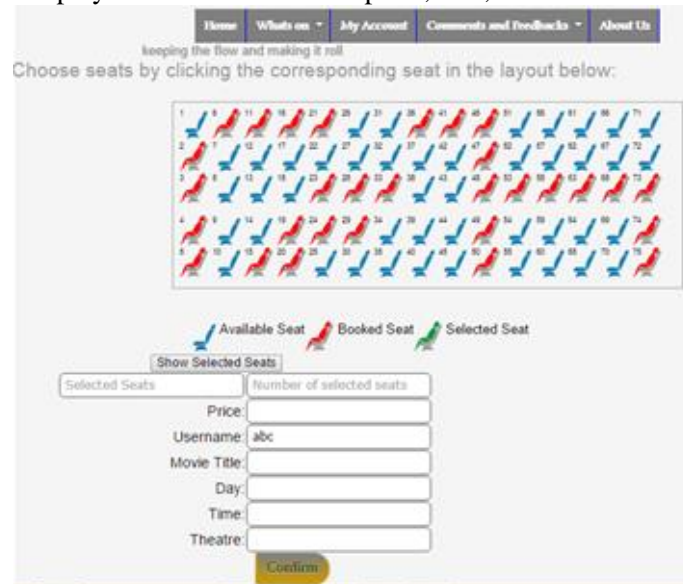


Figure 11. Seat booking page

In figure 11, the user after making up his mind to book a movie, is directed to this page above where he books the particular seat he wishes to sit.

The figure in figure 12 shows the payment page where the payment is done via a third party organization.

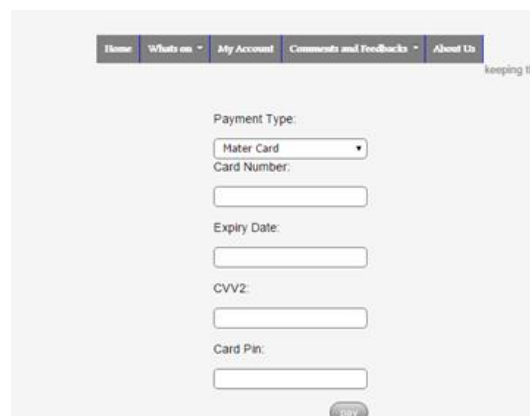


Figure 12. Payment page

Figure 13. Movie upload page

In figure 13, the movie upload page is a page for the admin where movies to be shown are uploaded to the website and the information about the movie is also uploaded alongside it by the administrator.

Figure 14. News upload page

In figure 14, the administrator uploads news related to movies and entertainments to the website, also news concerning the center is also uploaded to the website.

4. Conclusion

This project implements an online booking system for cinema houses mainly in Nigeria. It can be said with full assurance that if the system is fully implemented, all the advantages of an online booking system, such as, time saving, 24-hour working service, access to the service from anywhere in the world, availability check and instant, collecting all guest payments (i.e. using your own merchant account/payment gateway), and much more will be achieved.

Furthermore, the full implementation of this project will further improve the booking system of Nigerian cinemas, even in other areas of life where reservations or bookings are done, and could also revive the dying movie watching in cinemas, while also helping to cut down cost of servicing extra manpower needed to run report sorting.

5. Acknowledgement

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